Respositioning Weakly Attached Semiconductor Atoms by Controlled Release of Latent Heat in Substrate Using Light-Constrained Phononic Activity

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Introduction

The need to create very specific arrangements of atoms closely layered upon one another is not a problem limited to efforts to manufacture increasingly complex computer processors. Metamaterials used for blocking electromagnetic interference, for blocking pure magnetism, for photovoltaic conversion, for thermoelectric conversion and metamaterial optical lenses are all examples of physical structures which benefit from the ability to position materials in close proximity to one another and in a particular configuration. The smaller the structures and the fewer flaws introduced by the process of manufacture, the greater the capabilities of the materials.

Abstract

Although it is already within the realm of present-day capability to deposit a single atomic thickness of a material upon a substrate, it is more challenging to ablate materials from areas of a two-dimensional surface after initial deposition of the material. Atoms can be plucked from the layer one at a time in a laboratory setting, but this is not practical for mass manufacture of components. It is not practically possible to use light, for example, to cause an atom to detach from a substrate without introducing so much heat that neighboring atoms are also ejected as vapor.

I propose a system for repositioning already-desposited materials so that atoms may be made to migrate away from all of the areas where no material is desired. The first ingredient in such a process would be the adoption of a substrate known to be capable of retaining latent heat. As I've described in recent publications, the author has hypothesized that the documented but poorly-understood phenomenon of latent heat is released in response to the introduction of phononic energy for reason that the latent heat is being stored as rotational energy of the nucleus of atoms which can be converted into traditional thermal energy when the positional relationships between nuclei and their electron clouds are perturbed in unison with atom-atom collisions.

That said, the first step is to select a suitable material and to heat that material prior to allowing it cool. Imbued with latent heat, after an atomic thickness of material is introduced to the substrate, light may be introduced which restricts the flow of phononic energy exclusively to those areas which ones wishes to render devoid of the deposited material. Weak van der Waals-based attachments allow the attached semiconductor materials to roll along the surface of the substrate in response to external influences. Phononic energy is then purposefully introduced which floods into only the designated areas, cordoned off by light. The light would prevent vibrational energy from entering those areas where semiconductor materials were desired but would

permit individual atoms to cross the light boundary and to roll into position along the surface.

These materials would be repelled from the areas undergoing the active release of heat triggered by the aforementioned phononic injection and would consequently migrate into the desired areas due to ionic repulsion (as in a Crookes Radiometer.) Electrons are spontaneously generated and flow toward the unheated areas, creating an attractive force which pulls the materials toward the desired areas. This force is sufficiently subtle that it can allow for the creation of bespoke architectures without perturbing previously established parallel architectures.

Once the desired pattern is generated in a given layer, the layer may be finalized by a photonic bonding step which creates strong bonds between the substrate and the deposited material and a new layer may be created overlapping the previous layer by repeating the cycle of latent heat introduction and induction of controlled release under the condition of weak attachment. This can also allow for different materials to be added to the same two-dimensional layer after finalization and for disparate materials to be made to migrate as desired within the context of the same layer, which compounds being added one at a time between finalizing steps which create permanent bonds between material and substrate.

Conclusion

This approach is a true hybrid of LASER epitaxy, photofabrication, phononic and heat-based methods for materials manufacture. It is only through this combination of methods that one may create a sufficiently fine chisel for creating the most highly bespoke possible nanostructures.